



## The MOUND Tritium D&D Large-Scale Demonstration and Deployment Project

# LUMI SCINT PORTABLE LIQUID SCINTILLATION COUNTER

### THE NEED

In April of 1999, the U.S. Department of Energy Mound Environmental Management Project (DOE-MEMP) Office and BWXT of Ohio, Inc. conducted a demonstration using the Lumi Scint portable liquid scintillation counter. The intent of the demonstration was to compare the portable Lumi Scint system against the baseline liquid scintillation counter system. There is a need to detect surface tritium contamination in real time, for it will allow immediate response to contamination and increased worker safety awareness. The current, generally accepted method for detecting tritium is liquid scintillation counting of field swipes. This method, while effective, takes place in a counting laboratory which is removed from the area of measure and often backlogged with work. This current method, being removed from the contamination area, inherently causes delays in turn-around time from tens of minutes to hours. The down-time associated with these delays reduces productivity, increases costs, and most importantly, delays worker awareness of the area contamination.

### THE TECHNOLOGY

The Lumi Scint demonstrated at Mound is manufactured by Bioscan, Inc. The Lumi Scint is a portable, single-tube liquid scintillation counter that can be set to respond to the low-energy beta radiation from tritium. It uses a single photomultiplier tube and manual sample chamber. The Lumi Scint can be run from an internal battery or 110 VAC for its operation. The unit can be obtained with a printer, which will allow hard copies of its electronically stored data.

### THE DEMONSTRATION

The Demonstration of the Lumi Scint was conducted in three phases using Radiological Engineers and Site Radiation Control Technicians (RCT). Phase I was done in a known tritium contaminated environment. In Phase II, the instrument was used to conduct routine building tritium



surveys, and in Phase III, the Lumi Scint was used to conduct release surveys of a room scheduled to be released for general occupancy. Data collected during the demonstration included: survey results, type of work performed, waste generated, environmental conditions, sample preparation and turn-around times, gas usage, technical and processing difficulties, worker perception and feedback, ease of use, etc.

### RESULTS

The Lumi Scint technology proved very easy to use for the detection of tritium on contaminated surfaces. The Lumi Scint has proven accurate for counting the beta activity produced from tritium for large variations of activity. Use of a single PMT presented no problems for using the instrument for measuring tritium. The Lumi Scint tracked consistently against the baseline contamination swipe readings over the course of the demonstration. The instrument saved time when used for non-routine surveys/monitoring. RCT feedback about the quick turn-around time, portability, and ease of use, was positive. By taking the Lumi Scint to the source of activity, the user can obtain a significant reduction in time and labor requirements over the baseline technology.

This Large-Scale Demonstration & Deployment Project (LSDDP) was sponsored by the DOE Office of Science and Technology through the Deactivation and Decommissioning Focus Area managed from the National Energy Technology Laboratory in Morgantown, W.V. This demonstration is significant because it shows the effectiveness of near real time contamination detection capability.



BWXT of Ohio, Inc.



### CONTACTS

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# **Lumi Scint**

## **Portable Liquid Scintillation Counter**

**An innovative field counting device  
developed by Bioscan, Inc.**

The purpose for this counting device is to allow quick and efficient field-counted swipes and real-time surveillance of jobs where there is a potential for contamination spread

### **BENEFITS**

- Eliminates the “down” time required to transport the swipes
- Minimizes processing times by reducing handling
- Increases productivity
- Reduces labor costs
- Provides real-time surveillance of dismantlement work

### **EQUIPMENT**

- Compact (7” by 11.5” by 5.5”), lightweight (10.5 lb.), portable, single sample detector
- Designed to detect H-3, C-14, and P-32
- Operated using 110 VAC or batteries (~six hour life)
- Built-in data analysis and a parallel printer interface

### **BASELINE TECHNOLOGY**

- Laboratory-based liquid scintillation counters, located in a central counting room